

L 15780-63 EWT(l)/EWG(k)/EWP(q)/EWT(m)/BDS/EEC(b)-2/ES(w)-2
 AFFTC/ASD/ESD-3/SSD Pab-l/Pz-l JD/AT/JG

ACCESSION NR: AP3006467

S/0109/63/008/009/1626/1629

AUTHOR: Borisov, V. I.; Khlystov, V. D.

TITLE: Secondary electron emission of MgO films at low electron energies

SOURCE: Radiotekhnika i elektronika, v. 8, no. 9, 1963, 1626-1629

TOPIC TAGS: secondary electron emission, electron emission, magnesium oxide
 secondary emission, magnesium oxide

ABSTRACT: The dependence of the coefficient of secondary electron emission (σ), the coefficient of electron elastic reflection (R), and the coefficient of slow-electron emission (δ) on the energy of primary electrons in the 2-30-v range has been investigated for MgO films. Fig. 1 of the Enclosure is a diagram of the device used for the preparation and investigation of the films. The films were produced by depositing Mg containing not more than 0.001% Fe and Cu on a tungsten substrate (a disk 15-20 mm in diameter) at a residual gas pressure of 5×10^{-6} mm Hg, followed by oxidation in an oxygen atmosphere at a pressure of approximately 10^{-1} mm Hg and a temperature of approximately 500C. The duration

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ACCESSION NR: AP3006467

of the oxidation process was 1-2 hr, depending on film thickness; the latter did not exceed 1000 Å. The test device consisted of electron gun EG and target T, which could be adjusted by means of an external magnet. In its left position, the target occupied the center of the collector and in its right position was located in front of spiral-shaped tungsten sprayer S, which could be moved along a line perpendicular to the axis of the device. The analysis of secondary electrons was carried out under conditions of periodic pulses whose repetition rate was about 10 pulses/min. Fig. 2 shows the dependence of σ , R, and δ on primary electron energy. The investigation showed that the value of the first critical potential varies within 13 to 20 V and depends on film thickness and that secondary electrons start to occur in noticeable quantities at an energy corresponding to the width of the forbidden zone. Orig. art. has: 4 figures.

ASSOCIATION: none

SUBMITTED: 30Jul62

DATE ACQ: 30Sep63

ENCL: 02

SUB CODE: GE

NO REF SOV: 006

OTHER: 007

Card 2/12

BORISOV, V.L.; KHLISTOV, V.D.

Secondary electron emission of MgO films at small energies of
electrons. Radiotekh. i elektron. 8 no.9:1626-1629 S '63.
(MIRA 16:9)
(Magnesium oxides--Electric properties)
(Secondary electron emission)

BORISOV, Vl., inzh.

Setting the standards for geometric parameters of reducers.
Mashinostroene 11 no.12:22-24 D '62.

1. MASHPROEKT.

9.3/20
24 780

S/181/62/004/010/014/063
B108/B104

AUTHOR: Borisov, V. L.

TITLE: Effect of the backing material on the secondary emission of MgO films

PERIODICAL: Fizika tverdogo tela, v. 4, no. 10, 1962, 2738 - 2740

TEXT: The object of this study was to gain information on how the elastic and inelastic scattering of primary electrons on a backing affects the emissive properties of thin MgO layers (100 - 750 Å). Tungsten and graphite were chosen as backing since these materials have very different coefficients of inelastic electron scattering. The measurements were made with a pulsed electron beam in a highly evacuated secondary-emission assembly with an antidynatron grid. $\sigma_{\max}$ for MgO on a tungsten backing was about 1.5 times higher than $\sigma_{\max}$ for MgO on a graphite backing. The number of slow secondary electrons (~ 1.0 ev) produced by reflection from a tungsten backing increases with increasing V_p , i.e., with increasing energy of the primary electrons. For $V_p < 2$ kv, the thick MgO layers would exhibit a

Card 1/2

Effect of the backing...

S/181/62/004/010/014/063
B108/B104

lower secondary emission. This can be explained by the lower number of electrons inelastically reflected from the backing as the thickness of the MgO layer increases. There are 3 figures.

ASSOCIATION: Leningradskiy politekhnicheskiy institut im. M. I. Kalinina
(Leningrad Polytechnic Institute imeni M. I. Kalinin)

SUBMITTED: May 8, 1962

Card 2/2

BORISOV, Vasilii Matveyevich; NIKITIN, L.I., red.; SOKOL'SKAYA, Zh.M., red.
izd-va; SHITS, V.P., tekhn.red.

[Organization of fire prevention in the lumber industry]
Organizatsiia protivopozharnoi bezopasnosti v lesnoi promyshlen-
nosti. Moskva, Goslesbumizdat, 1957. 134 p. (MIRA 11:4)
(Lumbering--Fires and fire prevention)

190R/50V, 1.12

3

Hydrocyclone. V. M. Rotinov, I. Z. Margolin, and A. I. Angelov. U.S.S.R. 105,747, July 25, 1957. A cyclone for wet classification comprises conical and cylindrical parts with a disk-shaped diaphragm installed above them. The diaphragm is provided with a changeable axial tube. A 2nd diaphragm having a coaxial changeable tube is installed between the diaphragm and an overflow cylinder. The 2 diaphragms delineate a water-filled chamber where solid particles thrown out by centrifugal forces of the ascending stream are collected.

M. Hosh

anf

SHESTOPALOVA, N.M.; REYNGOL'D, V.N.; BORISOV, V.M.

Submicroscopic structure of the needlelike crystals of epithelial cells of the intestinal mucous membrane and their place in the endoplasmatic reticulum system. Dokl. AN SSSR 153 no.2:454-456 N '63. (MIRA 16:12)

1. Institut poliomyelita i virusnykh entsefalitov AMN SSSR.
Predstavleno akademikom A.N.Bakulevym.

*

L 11134-66 EWT(1)/EWP(m)/EWA(d)/FCS(k)/EWA(1)

ACC NR: AP6002616

SOURCE CODE: UR/0258/65/005/006/1028/1034

AUTHOR: ⁵⁵ Borisov, V. M. (Moscow)

ORG: none

TITLE: On a family of minimum-drag bodies

SOURCE: Inzhenernyy zhurnal, v. 5, no. 6, 1965, 1028-1034

TOPIC TAGS: supersonic aerodynamics, inviscid flow, isentropic flow, variational problem, viscous flow, Cauchy problem

ABSTRACT: Two variational problems of determining the optimum configuration of axially symmetric minimum-drag bodies are considered. The analysis is based on the exact equations of a steady isentropic flow of a viscous non-heat-conducting gas. The differential equations of flow are considered as supplementary relations taken into account by introducing Lagrange multipliers. The first problem consists in determining the surface formed by a generatrix passing through three given points. In the second problem, the surface is formed by two generatrices passing through two pairs of given points (channel flow). The problems are formulated in the form proposed by K. G. Guderley and I. V. Armitage in 1962. Solutions of the Cauchy and Goursat problems were used to obtain a basis for the construction of optimum profiles. Axisymmetric optimum profiles were constructed for $M = 1.5$ as an illustrative example. The author thanks Yu. D. Shmyglevskiy and A. V. Shipilin ⁵⁵ for their constant interest. Orig. art. has: 6 figures and 18 formulas. [AB]
UDC: 533.6.011.5
Card 1/1

L 11134-66

ACC NR: AP6002616

SUB CODE: 20/ SUBM DATE: 14Aug65/ ORIG REF: 005/ OTH REF: 001/ ATD PRESS:

4174

CC

Card 2/2

BORISOV V. M.

USSR/Chemistry - Arsenic Compounds

Nov 52

238T21
"Concerning Certain Physicochemical Properties of Arsenous Oxide," V. M. Borisov and M. G. Gorshteyn, State Inst of Mineral-Chem Raw Materials

"Zhur Obshch Khim" Vol 22, No 11, pp 1903-1906

On the basis of known data concerning the physico-chem properties of arsenous oxide, the structures of different forms of arsenous oxide were examined more carefully. It was established that melting of the octahedral form of As_2O_3 proceeds polythermally.

238T21

The crystals of this form began to melt at $270^{\circ}C$, and melted completely between $290^{\circ}-295^{\circ}C$. The stable form of arsenous oxide, up to its mp, is its octahedral form.

238T21

BORISOV, V. M.

Chemical Abstracts
Vol. 48 No. 5
Mar. 10, 1954
General and Physical Chemistry

Physical-chemical properties of arsenic trioxide. V. M.
Borisov and M. G. Gornsteln. *Chem. Tech. (Berlin)* 5,
319-20 (1953).—See C.A. 47, 3074f. S. K. T.

MF
7-27-54

Borisov, V. M.

USSR/Chemistry - Flotation

FD-870

Card 1/1 Pub.50 - 3/24

Author : Borisov, V. M.

Title : ~~USSR/Chemistry - Flotation~~
A method for the physicochemical evaluation of the interaction of reagents with the surface of mineral grains in flotation

Periodical : Khim. prom., No 6; 336-338 (16-18), Sep 1954

Abstract : Proposes measurement of the electrokinetic potential as a method of evaluating the interaction of reagents with mineral grains in the flotation of mined raw materials other than metal ores. Describes details of the method and results of the research on which the method is based. Ten references, all USSR, all since 1940. Three graphs, five tables.

Institution : State Scientific Research Institute of Mined Chemical Raw Materials, Ministry of Chemical Industry

Submitted :

BORISOV, V. M.

USSR/Minerals - Chemical technology

Card 1/1 Pub. 22 - 24/40

Authors : Borisov, V.M.

Title : ~~Electrokinetic~~ characteristics of surfaces of minerals and their effect on the floatability of the latter

Periodical : Dok. AN SSSR 99/3, 427-430, Nov 21, 1954

Abstract : The role of the zeta-potential of the surface of mineral grains, during floatation cleavage of the latter, is discussed. The value of the zeta-potential on the surface of pure mono-mineral powders was estimated by means of electroosmosis. The positive sign of the zeta-potential indicates a predominance of cations and the negative sign - predominance of anions on the surface of the given mineral. The zero-value of the zeta-potential shows equilibrium between cations and anions on the surface of the mineral. The floatation activity of the surface increases when the surface charge approaches the isoelectric point. Six USSR references (1930-1953). Tables; graphs.

Institution : State Scientific Research Institute of Mineral-Chemical Raw Material

Presented by : Academician S.I. Vol'fkovich, July 17, 1954

BORISOV, V. M.
USSR/Chemistry - Flotation

FD-2526

Card 1/1 Pub. 50 - 5/14

Author : Borisov, V. M.

Title : ~~XXXXXXXXXXXX~~
 : The effects of caustic alkali and soda on the flotation
 : properties of non-sulfidic minerals

Periodical : Khim. prom. No 4, 213-217, Jun 1955

Abstract : Measured for various minerals the dependence between the elec-
 : trokinetic potential and flotation capacity as affected by ad-
 : ditions of caustic alkali and soda. Nine references; 8 USSR,
 : 5 since 1940. Eight graphs, 4 tables.

Conditions for the beneficiation of the difficult-to-enrich phosphatite ores of the Kara-Tau deposit. V. M. Borisov. *Zh. Prikl. Khim.* 1956, 13-19. The phosphatite in the important Kara-Tau Mountain deposit is intimately intergrown with dolomite and chalcedony, and their separation is difficult. By testing the selective adsorption of Na oleate upon apatite, phosphatite, and dolomite, a difference was observed caused by the presence of free H_3PO_4 in the soln. At a 1000 mg. H_3PO_4 (calcd. as P_2O_5)/l. of the soln., the H ions upon the phosphate rocks prevented entirely the oleate ion adsorption. Measurements of the electrokinetic (or ζ) potential will give information on the selectivity, and on the reagent consumption in the dolomite flotation, and has been successfully used in the flotation beneficiation of the ore. W. M. Sternberg

1. Gosudarstvennyy Institut
(phosphatite) *Gosudarstvennyy Institut* *Syrya*

BORISOV, V.M., kandidat tekhnicheskikh nauk; AFANAS'YEV, N.A., kandidat
tekhnicheskikh nauk.

Development of the potassium industry. Khim.nauka i prom. 1
no.2:146-149 '56. (MLRA 9:9)

(Potash industry)

BORISOV, V. M.
BORISOV, V.M.

Electrokinetic phenomena accompanying the interaction of chemical
collectors with minerals during flotation. Khim.prom. no.5:284-287
Jl-Ag '57. (MIRA 10:12)

1.Gosudarstvennyy institut gornokhimicheskogo syr'ya.
(Flotation)

BORISOV, V. M., Doc of Tech Sci -- (diss) "Physico-chemical Basis and
New Flotation Methods of the Production of Elementary Brimstone,"
Moscow, 1959, 39 pp (Institute of Mining, Acad Sci USSR) (KL, 2-60,112)

SOKOLOV, A.S.; MENKOVSKIY, M.A.; BORISOV, V.M.; SERGEYEVA, N.A., red. izd-
va; IYERUSALIMSKAYA, Ye.S., tekhn. red.

[Industry's requirements as to quality of mineral raw materials]
Trebovaniia promyshlennosti k kachestvu mineral'nogo syr'ia;
spravochnik dlia geologov. Izd.2., perer. Moskva, Gos. nauchno-
tekhn. izd-vo lit-ry po geol. i okhrane neдр. No.47. [Native sulfur]
Samorodnaia sera. Nauchn. red. V.M.Borisov. 1961. 42 p.
(MIRA 14:11)

1. Moscow. Vsesoyuznyy nauchno-issledovatel'skiy institut mineral'-
nogo syr'ia.

(Sulfur)

BLOKHIN, Konstantin Agapovich; PASHININ, Sergey Afanas'yevich; CHLENOV, M.T., kand. tekhn. nauk, retsenzent; NALICHAYEV, V.N., inzh., retsenzent; BORISOV, V.M., inzh., retsenzent; MELENETS, V.V., inzh., retsenzent; SERGEYEVA, A.I., inzh., red.; BOBROVA, Ye.N., tekhn. red.

[Track overhauling operations] Kapital'nye putevye raboty. Moskva, Transzheldorizdat, 1962. 326 p. (MIRA 15:12)
(Railroads--Maintenance and repair)

BORISOV, Vladimir Mikhaylovich, stalevar; GRUBNIK, P.D., red.;
LIMANOVA, M.I., tekhn. red.

[A matter of worker's honor] Delo rabochei chesti. Khar'kov,
Khar'kovskoe knizhnoe izd-vo, 1962. 19 p. (MIRA 16:6)

1. Khar'kovskiy traktorny zavod im. Ordzhonikidze, rukovodi-
tel' brigady kommunisticheskogo truda im. XXII s"ezda KPSS
(for Borisov). (Kharkov—Tractor industry)
(Efficiency, Industrial)

BORISOV, V.M., doktor tekhnicheskikh nauk; AFANAS'YEV, N.A., kand.tekhn.nauk

Problems of raw materials for the basic chemical industry. Zhur.
VKHO 7 no.1:10-17 '62. (MIRA 15:3)
(Chemical industries) (Raw materials)

BORISOV, V.M.; GOLGER, Yu.Ya.

Measurement of the thermodynamic and absorption potentials of dielectric minerals in studying the flotation process. Dokl. AN SSSR 146 no.3: 628-630 S '62. (MIRA 15:10)

1. Predstavleno akademikom S.I.Vol'fkovichem.
(Flotation) (Dielectrics)

ARUTYUNYAN, B.Sh.; BORISOV, V.M.; ZHEPLINSKIY, B.M.; MESROPYAN, N.N.;
MESHCHERYAKOV, N.F.; UL'YANOV, N.S.

Apparatus for the destruction of flotation froth. Khim. prom.
no.2:146-147 F '63. (MIRA 16:7)

(Flotation)

S/040/63/027/001/025/027
D251/D308

AUTHORS: Borisov, V.M. and Shmyglevskiy, Yu.D. (Moscow)

TITLE: On the set-up of variation problems of gas dynamics

PERIODICAL: Prikladnaya matematika i mekhanika, v. 27, no. 1,
1963, 183-185

TEXT: The author considers a two-dimensional iso-energetic and isentropic flow expressed as a contour integral. The set-up of variation problems for such a flow are given. Two methods of dealing with the problem of maximum nozzle thrust and one general variation problem are given. There is 1 figure.

SUBMITTED: October 10, 1962

Card 1/1

ACCESSION NR: AP3004965

S/0208/63/003/004/0788/0793

AUTHOR: Borisov, V. M. (Moscow)

TITLE: On the optimum body shape in supersonic gas flow

SOURCE: Zhurnal vy*chisl. matematiki i matematich. fiziki, v. 3, no. 4, 1963, 788-793

TOPIC TAGS: gas dynamics, extremum problem, supersonic gas flow, shock wave, drag, variational problem, real gas effect

ABSTRACT: Two variational problems in gas dynamics have been considered. The first is an extremum problem in a perfect supersonic gas flow where the wave impedance over a body of revolution is minimized. The first family characteristics Aa is given along with the shock wave at "a" and its inclination σ_a (see Fig. 1 on the Enclosure). The axisymmetric gas dynamic equations are written for a perfect gas to determine the shape of AB for minimum drag. These are written as a set of six conditions, including the functional X defining drag, the functional X as a function of α, β, σ and r , three boundary conditions and two initial conditions. It is shown that a solution exists in the case of a boundary extremum determined by the bounds of admissible function domains. The variational problem is subsequently

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ACCESSION NR: AP3004965

extended to include real gas effects in equilibrium, isentropic flow. A numerical example is given corresponding to flow with $M = 2$, $p = 4.5$ atm, $T = 2048K$. "The author is grateful to Yu. D. Shmyglevskiy and A. N. Krayko." Orig. art. has 19 equations and 6 figures.

ASSOCIATION: none

SUBMITTED: 29Oct62

DATE ACQ: 30Aug63

ENCL: 01

SUB CODE: AI

NO REF SOV: 006

OTHER: 002

Card 2/32

BORISOV, V.M.; SHMYGLEVSKIY, Yu.D. (Moskva)

Setting variational problems of gas dynamics. Prikl. mat.
i mekh. 27 no.1:183-185 Ja-F '63. (MIRA 16:11)

BORISOV, V.M.; GOLGER, Yu.Ya.; RATOBYL'SKAYA, L.D.

Relation between the ϕ -potential and the surface charge with
its flotation properties. Khim. prom. no.10:762-765 O '63.
(MIRA 17:6)

BORISOV, V.M. (Moskva); SHIPILIN, A.V. (Moskva)

Nozzles for maximum thrust with arbitrary isoperimetric
conditions. Prikl. mat. i mekh. 28 no.1:182-183 Ja-F'64.
(MIRA 17:2)

BORISOV, V. M.; VOL'FKOVICH, S. I.; LENSKIY, A. S.; TERNOVSKAYA, A. N.;
BERNATSKIY, Yu. P.

In memory of Arkadii Mikhailovich Malets, d. 1963. Khim prom
no. 3:233 Mr '64. (MIRA 17:5)

ANGELOV, A.I.; BORISOV, V.M.

Electrostatic concentration of phosphorite ores. Khim. prom.
no. 4:251-258 Ap '64. (MIRA 17:7)

BORISOV, V.M.; GRIGORYANTS, Yu.M.

Specialized repair of measuring equipment in the Lower Volga
Economic Region. Izv. tekhn. no.12:48-51 D '64.

(MIRA 18:4)

IEPESHKOV, I.N.; BORISOV, V.M.; SHAPOZHNIKOVA, A.N.; ZAYTSEVA, I.S.

Separation of natural polyhalite salt in hydrocyclones. Khim.
prom. no.6:437-439 Je '64. (MIRA 18:7)

BORISOV, V.M.; DANILINA, Ye.A.

Results of the analysis of the work of the track repair machinery
stations. Put' i put.khoz. 9 no.8:7-9 '65.

(MIRA 18:8)

1. Nachal'nik Putevoy mashinnoy stantsii No.52, stantsiya Otreshkovo,
Moskovskoy dorogi (for Borisov). 2. Starshiy inzh. Putevoy mashinnoy
stantsii No.52, stantsiya Otreshkovo, Moskovskoy dorogi (for Danilina).

Ps-1/Pw-1 WW

ACCESSION NR: AP5006259

S/0040/65/029/001/0106/0113

AUTHOR: Borisov, V. M. (Moscow)

TITLE: Variational problem of three-dimensional hypersonic flow

44
B

SOURCE: Prikladnaya matematika i mekhanika, v. 29, no. 1, 1965, 106-113

TOPIC TAGS: nozzle, hypersonic flow, nozzle optimization, nozzle design

ABSTRACT: The design of the diverging section of a hypersonic nozzle with maximum thrust is analyzed. The first exact solution of this problem was obtained by Shmiglevskiy in one-dimensional form. In the present study, the functionals were correlated by the differential flow equations, and the extremum conditions were determined as a boundary problem for a system of nonlinear partial differential equations, with boundary conditions extending over the entire surface confining the flow core. In the case when the restraints are related only to the initial contour of the nozzle, a group of optimum spatial solutions is obtained for which the number of independent variables in the boundary problem can be reduced. Orig. art. Has: 2 figures and 33 formulas. [PV]

ASSOCIATION: none

Card 1/2

L 32114-65

ACCESSION NR: AP5006259

SUBMITTED: 21May64

ENCL: 00

SUB CODE: ME

NO REF SOV: 003

OTHER: 001

ATD PRESS: 3200

Cerd 2/2

BORISOV, V.M. (Moskva)

System of bodies with a minimal wave resistance. Inzh. zhur.
5 no.6:1028-1034 '65. (MIPA 19:1)

1. Submitted August 14, 1965.

BORISOV, V.M.; LENSKIY, A.S.

Basic means for the development and tasks of the mineral fertilizer
industry. Khim.prom. no.1:13-16 Ja '64. (MIRA 17:2)

1. Nauchno-issledovatel'skiy institut po udobreniyam i insekto-
fungitsidam im. Ya.V.Samoylova.

ACCESSION NR: AP4013393

S/0040/64/028/001/0182/0183

AUTHORS: Borisov, V. M. (Moscow); Shipilin, A. V. (Moscow)

TITLE: Maximal thrust nozzles with arbitrary isoperimetric conditions

SOURCE: Prikladnaya matematika i mekhanika, v. 28, no. 1, 1964, 182-183

TOPIC TAGS: jet, nozzle, maximal thrust, isoperimetric condition, numerical solution, boundary value problem, nonlinear partial differential equation, lateral surface, Lagrange multiplier

ABSTRACT: K. G. Guderley and J. V. Armitage (A General Method for the Determination of Best Supersonic Rocket Nozzles. Paper Presented at the Symposium on Extremal Problems in Aerodynamics, Boeing Scientific Research Laboratories Flight Sciences Laboratory, Seattle, Washington, December 3-4, 1962) obtained necessary conditions for an extremum in the problem of nozzles with greatest thrust under arbitrary conditions on the nozzle wall. Numerical solution of this problem is tied up with a very complex boundary value problem for nonlinear partial differential equations. The present authors find one class of solutions for this boundary value problem. Orig. art. has: 10 formulas and 1 diagram.

Card 1/2

ACCESSION NR: AP4013393

ASSOCIATION: none

SUBMITTED: 24Oct63

DATE ACQ: 26Feb64

ENCL: 00

SUB CODE: AI

NO REF SOV: 001

OTHER: 001

Card 2/2

BORISOV, V. N.; ALEKSANDROV, D. S.; MEZHUYEVA, V. V.

Study of the arc quenching properties of freon and electron
gas. Elektroenergetika no.6:129-136 '62. (MIRA 16:4)

(Freon—Electric properties)

(Electron gas—Electric properties)

(Electric switchgear)

BORISOV, V. N.; ALEKSANDROV, D. S.; MEZHUYEVA, V. V.

Study of the quenching of an electric arc in an electron gas.
Elektroenergetika no.6:137-152 '62. (MIRA 16:4)

(Electron gas—Electric properties)
(Electric switchgear)
(Electric arc)

BORISOV, V.N. (Moskva), MOTSKUS, I.B. (Moskva)

Problems of the experimental and theoretical determination of
the recovery of the dielectric strength of an air gap in an air
breaker. Izv. AN SSSR. Otd. tekhn. nauk. Energ. i avtom. no.6:28-
34 N-D '60. (MIRA 13:12)

(Electric circuit breakers)

MOVNIN, Mikhail Savel'yevich, doktor tekhn. nauk, prof.; MITINSKIY, Arsenii Nikolayevich, prof.[deceased]; prinyal uchastiye: GOL'TSIKER, D.G., inzh.; BORISOV, V.N., dotsent, kand. tekhn. nauk, retsenzent; SAMUYILO, V.O., V.O.dots., retsenzent; TAUBER, B.A., prof., retsenzent; CHERNAVSKIY, S.A., dotsent, retsenzent; ITSKOVICH, G.M., inzh., nauchnyy red.; PITERMAN, Ye.L., red. izd-va; PARAKHINA, N.L., tekhn. red.

[Technical mechanics; strength of materials, theory of mechanisms and machines. Machine parts] Tekhnicheskaya mekhanika; soprotivleniye materialov; teoriya mekhanizmov i mashin. Detali mashin. Izd. 2., perar. Moskva, Goslesbumizdat, 1961. 781 p. (MIRA 14:6)
(Mechanical engineering) (Strength of materials)

STEKOLONIKOV, I. S.; KOMELKOV, V. A.; BOGOMOLOV, A. F.; LIKHACHEV, F. A.; BORISOV, V. N.;
LOPSHITS, L. M.
BORISOV, V. N.

BORISOV V. N.

Grozozashita Promyshlennykh Sooruzhenii i Zdanii (Lightning Protection of
Industrial Structures and Buildings), 202 p., Publ. House of the AS USSR,
Moscow, 1951.

BORISOV, V.N. :

To the remarks of D.P. Lavrov on "Lightning protection for industrial installations
and buildings." Elektrichestvo, no. 3, 1952
Inzh

BORISOV, V. N.

The Committee on Stalin Prizes (of the Council of Ministers USSR) in the fields of science and inventions announces that the following scientific works, popular scientific books, and textbooks have been submitted for competition for Stalin Prizes for the years 1952 and 1953. (Sovetskaya Kultura, Moscow, No. 22-40, 20 Feb - 3 Apr 1954)

<u>Name</u>	<u>Title of Work</u>	<u>Nominated by</u>
Stekol'nikov, I. S.	"Lighting Protection of	Power Engineering Institute
Komel'kov, V. S.	Industrial Structures and	Imeni U. M. Khrushchevskiy,
Bogomolov, A. F.	Buildings"	Academy of Sciences USSR
Likhachev, F. A.		
<u>Borisov, V. N.</u>		
Lopshin, L. N.		

SO: W-30604, 7 July 1954

BOYKO, V.M. --

"The Protection of Linear-Compensating Condensers from a Voltage Surge by Means of an Arrestor With and Air Blast." Cand Tech Sci, Power Engineering Institute G. M. Krzhizhanovskiy, Acad Sci USSR, 21 Oct 54 (VM, 11 Oct 54)

Survey of Scientific and Technical Dissertations Defended at USSR Higher Educational Institutions (10)

SO: Ser. No. 481, 5 May 55

BORISOV, V. N.
USSR/ Electricity - Electrical equipment

Card 1/1 Pub. 124 - 7/39

Authors : Borisov, V. N., Cand. Tech. Sc.

Title : Protection of capacitors used for long-distance compensation

Periodical : Vest. AN SSSR 25/5, 44 - 45, May 1955

Abstract : An account is given of experimentation for the development and testing of devices designed to protect batteries of capacitors which are connected across the lines in long-distance transmission of AC current. The devices effect the instantaneous cutout of the capacitors in the case of a short circuit and switch them back into operation when the danger is passed.

Institution :

Submitted :

Boisov, L. N.

STEKOL'NIKOV, Il'ya Samuilovich; BORISOV, Vladimir Nikolayevich; SMIRNOV, Il'ya Grigor'yevich; OTOCHEVA, M.A., redaktor izdatel'stva; KONIA-SHINA, A.D., tekhnicheskiy redakter.

[Lightning Protection of buildings and equipment in agricultural localities] Grebezashchita zdaniy i sooruzheniy v sel'skoi mestnosti. Moskva, Izd-vo M-va kommun.khoz.RSFSR, 1956. 86 p.

(MIRA 10:4)

(Lightning protection)

BORISOV, V.N.

AUTHOR: ARONZON, N.Z., BORISOV, V.N. PA - 2166
TITLE: Electric Disruptive Strength of Air in an Air Switch.
(Elektricheskaya prochnost' vozdukha v vozdushnom vyklyuchatele.
Russian).
PERIODICAL: Izvestia Akad.Nauk SSSR, Otdel Tekhn. 1957, Vol , Nr 1,
pp 149-152 (U.S.S.R.)
Received: 3 / 1957 Reviewed: 4 / 1957
ABSTRACT: The level and the character of the modification according to time
of the electric disruptive strength of compressed air moving in
an air switch is investigated in order to ascertain possible
reasons for faulty ignition. The objects used in connection with
this investigation were: the experimental chamber with a number
of exchangeable electrodes of various shapes and the interspaces
of a switch of Russian manufacture. The device used was worked
out in 1953 at the Institute for Energy of the Academy of Science
of the U.S.S.R. For purposes of investigation comparison of the
modification of the character of the electric disruptive strength
of the interelectrode space according to time served as a basis,
viz. usually in the case of a constant length (30 mm) of this
space, different shapes of electrodes, stopping down of the in-
put apertures of the electrodes with diaphragms of different
diameters, in the case of a complete stoppage of the egress of
air by one of the electrodes, and in the case of an intended

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PA - 2166

Electric Disruptive Strength of Air in an Air Switch.

formation of vortices in the chamber by the removal of equalizing partition walls. It was found that, with certain conditions governing the egress of compressed air which is determined by the configuration of the electrodes, the electric disruptive strength of the operation sphere of the air switch is considerably lower than in the case of immobile air with the same pressure. The decrease of disruptive strength below the level of the acting voltage is the basic cause of the occurrence of repeated ignition during the currentless interval. This disadvantage can be eliminated by means of a slight stopping down of the output apertures of the electrodes or by the application of a system with unilateral blowing. (8 illustrations).

ASSOCIATION: Not given
PRESENTED BY:
SUBMITTED: 13.6.1956
AVAILABLE: Library of Congress

Card 2/2

SOV/24-58-4-30/39
AUTHORS: Aronzon, N. Z., Borisov, V. N. and Obolduyev, S.G.
(Moscow)
TITLE: Circuit for Generating Unipolar Current Pulses
(Skhema dlya generatsii unipolyarnykh impul'sov toka)
PERIODICAL: Izvestiya Akademii Nauk SSSR, Otdeleniye Tekhnicheskikh
Nauk, 1958, Nr 4, pp 144-145 (USSR)
ABSTRACT: Equipment is being extensively used which requires
powerful current and voltage pulses of very short
durations. In such generators a capacitance is
usually discharged across a load by means of a
controlled gas discharge device. This capacitance
and the inductance of the load form an oscillating
circuit and the task of the switching device is to
allow the passage of the first half-wave of the current
of the oscillating discharge. If the amplitude of
current pulses exceeds several thousand amperes and
their duration is below a few μ sec, existing gas
discharge devices, although having a high throughput
capacity as regards the current, will be unsuitable
due to back-firings. To eliminate this drawback, a
Card1/4 method has been described by Chuchalin and Razin (Ref 1)

SOV/24-58-4-30/39

Circuit for Generating Unipolar Current Pulses

consisting of connecting an additional gas discharge device in parallel with the storage capacitance which "absorbs" from the capacitance the charge of opposite polarity. However, as was mentioned in the dissertation of one of the authors, N. Z. Aronzon, "Striking and its improvement in an arc valve", such a method proved impracticable in the case of such high current intensities due to the difficulties of striking the "absorbing" ignitron. Therefore, the simpler method of eliminating back-firings is of interest which consists in connecting a resistance into the discharge circuit so that this circuit becomes a damped one. An obvious disadvantage of this method is that for obtaining an equal amplitude of the current intensity the voltage has to be 2.5 times as high as in circuits without such/damping resistance. However, this disadvantage can to some extent be eliminated by using as a damping element a resistance in parallel with a capacitance. If the values of the resistance R_2 and the capacitance C_2 (Fig 1) are

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Circuit for Generating Unipolar Current Pulses

suitably chosen, unipolar impulses can be generated by means of such a circuit, the amplitudes of which are considerably higher than in circuits with only a resistance as a damping element. In the above mentioned dissertation a calculation is given for a selected ratio of the parameters. In this paper the author calculates the optimum ratio of the parameters for a circuit arrangement as shown in Fig 1, wherein L and R_1 are respectively the inductance and the resistance of the load, C_1 is the storage capacitance. In view of the difficulties of analytical investigation of the problem, the authors applied the oscillographic investigation on models. It can be seen from the results graphed in Fig 3 that the maximum attainable amplitude of unipolar current impulses by means of a circuit as shown in Fig 1 is 0.59 to 0.55, i.e. about 50 to 60% higher than the relative amplitude of an ordinary aperiodically damped discharge. In Fig 4 characteristic oscillograms of unipolar pulses are graphed for various ratios of the circuit parameters;

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SOV/24-58-4-30/39
Circuit for Generating Unipolar Current Pulses
in this figure curve 3 corresponds to the maximum
attainable amplitude.
There are 4 figures and 1 Soviet reference.

SUBMITTED: November 15, 1957

Card 4/4

BORISOV, V.N.

Meeting on requirements for high-voltage cutouts. Elektrichestvo
no. 11:93 N '60. (MIRA 13:12)
(Electric cutouts)

BORISOV, V.N.

New principle for designing an internal overvoltage limiting dis-
charger. Elektroenergetika no.5:55-66 '62. (MIRA 15:4)
(Electric power distribution--High tension) (Electric protection)

S/196/62/000/002/022/023
E194/E155

AUTHORS: Borisov, V.N., and Obukh, A.A.

TITLE: An arrester to limit the internal overvoltages. with
arc-suppression in air and linear resistors

PERIODICAL: Referativnyy zhurnal, Elektrotehnika i energetika,
no.2, 1962, 23, abstract 2I 156. (Elektr. stantsii,
no.5, 1961, 65-71).

TEXT: The Energeticheskiiy Institut (Power Engineering
Institute) of AS USSR has developed an arrester with forced
extinction of the follow-up current arc by air blast at an
excess pressure of 0.2-0.3 atm. By controlling the air-blast
pressure, the ratio between extinction and breakdown voltages may
be made near to unity or even more. The working resistances are
metallic so that energy can be dissipated for almost any duration
of overvoltage. Such an arrester with 'soft' arc suppression can
reliably suppress currents of 2 - 3 kA and makes it possible to
maintain the breakdown voltage at a single level with both
atmospheric pressure and with blast. This principle was used to



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An arrester to limit the internal... S/196/62/000/002/022/023
E194/E155

make an arrester for 110 kV consisting of three spark gaps in series with metal current-limiting resistance. The voltage is distributed between the gaps by a capacitative divider. Two of the gaps are used for arc suppression, and air under pressure is supplied to them; the third gap is not arc-suppressing and serves to reduce the electric strength of the first two at the instant of application of air blast to them. An electromagnet acting on the valve system which supplies compressed air to the arc-suppression gaps is connected to a saturating current transformer and operates only after breakdown of the spark gaps. Tests on a model of the arrester showed that this principle can be extended to high-voltage arresters. By altering the gaps without arc suppression and by altering the excess pressure in the arc-suppression gaps, the ratio between the suppression and breakdown voltages can be varied over a wide range. The current value has no important influence on the suppression characteristics of the arrester. The working resistance can be made of steel tape.

[Abstractor's note: Complete translation.]

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L 63600-65 BFT(d)/T LJP(c)

ACCESSION NR: AP5016969

UR/0280/65/000/003/0071/0075

AUTHOR: Borisov, V. N. (Moscow); Fedoseyev, V. A. (Moscow)

23

B

TITLE: Criterion for the feasibility of logical function realization by means of a threshold element

SOURCE: AN SSSR. Izvestiya. Tekhnicheskaya kibernetika, no. 3, 1965, 71-75

TOPIC TAGS: logical function realization, threshold element, realization feasibility, code distance, Muroga function

ABSTRACT: A criterion is proposed for determining the feasibility of realization, by means of a single threshold element, of a logical function specified in the form of a true table of values. The criterion does not require cumbersome calculations and is in the form of a theorem specifying the necessary and sufficient conditions. It utilizes the concept of code distance and the minimum sub-code and assumes the carrying out of not more than $m(m-1)/2$ checks with code combinations of binary variables (m is the number of unit and zero values of the logical function in question). Illustrative examples deal with a function of four variables, the Muroga function (Proc. Internat. Conf. and Information Processing, Unesco, Paris, 1959), and the Varshavskiy problem (Voprosy

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L 63600-65

ACCESSION NR: AP5016969

teorii matematicheskikh mashin, 1962, no. 2), invented to disprove Muroga's criterion. Orig. art. has: 1 formula, 1 figure, and 3 tables.

ASSOCIATION: none

SUBMITTED: 27Jun64

ENGL: 00

SUB CODE: MA, DP

NO REF SOV: 001

OTHER: 001

Card

2/2

BORISOV, V.N.; BONDAREVA, S.T.

Toxinfection on fur farms in the Taymyr. Veterinarlia 41 no.4:43-44
Ap '65. (MIRA 18:6)

1. Nauchno-issledovatel'skiy institut sel'skogo khozyaystva Kraynego
Severa.

24.6820

S/166/62/000/002/005/008
B112/B104

AUTHORS: Borisov, V. O., Kiv, A. Ye., Niyazova, O. R.

TITLE: Some features of cadmium sulfide probe characteristics

PERIODICAL: Akademiya nauk Uzbekskoy SSR. Izvestiya. Seriya
fiziko-matematicheskikh nauk, no. 2, 1962, 55-58

TEXT: X-ray probe characteristics of CdS found empirically are confronted with the theoretical characteristic expressed in the formula $I(x)/I_0 \equiv i(x_0) = (L_d/l)(\ln 2 - \exp((2\varepsilon - 1)/2L_d)\text{ch}((2x_0 - 1)/2L_d))$. (1), where l denotes the crystal length, ε the half-width of the X-ray probe ($\varepsilon \ll 1$), and x_0 the coordinate of X-ray probe position. L_d is the diffusion length, assumed to be the same for holes and electrons. The inequality $1 < L_d < 1/0.7$ follows from the shape of the characteristics as given by (1). In addition, the temperature and exposure dependences of probe characteristics are investigated. There are 3 figures.

✓B

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Some features of cadmium sulfide ...

S/166/62/000/002/005/008
B112/B104

ASSOCIATION: AN UzSSR (AS UzSSR)

SUBMITTED: December 18, 1961

✓B

Card 2/2

BORISOV, V.O.; KIV, A.Ye.; NIYAZOVA, O.R.

Some specific probing characteristics of cadmium sulfide. Izv.
AN Uz. SSSR. Ser. fiz. mat.nauk 6 no.2:55-58 '62. (MIRA 15:9)

1. Akademiya nauk UzSSR.
(Cadmium sulfide--Electric properties)
(X-ray crystallography)

BORISOV, V.P.

TOLKACHEV, P.I., inzh.; BORISOV, V.P., inzh.

High-temperature furnace made of heat-resistant reinforced
concrete blocks. Stroi.prom. 35 no.9:32-35 no.9:32-35 S '57.
(Furnaces) (MLRA 10:10)

BORISOV, V.P.

Designing frames having uniform resistance to bending. Trudy
KAI 46:107-112 '59. (MIRA 14:2)
(Structural frames)

BORISOV, V.P.

Designing continuous beams having uniform resistance to bending.
Trudy KAI 46:95-105 '59. (MIRA 14:2)
(Girders)

BORISOV, Vladimir Petrovich; KHANYKOV, Vladimir Vladimirovich;
KUZNETSOVA, N.I., red.; SHADRINA, N.D., tekhn.red.

[Financial work of the factory, plant and local trade union
committee] Finansovaya rabota fabrichnogo, zavodskogo i
mestnogo komiteta profzoiusa. Moskva, Izd-vo VTsSPS Profiz-
dat, 1959. 125 p. (MIRA 13:2)
(Trade unions--Finance)

BORISOV, Vladimir Petrovich; KHANYKOV, Vladimir Vladimirovich;
SEMENOV, S.M., red.; SHADRINA, N.D., tekhn. red.

[Budget of the factory and plant trade-union committee]
Biudzhët fabrično-zavodskogo komiteta. Moskva, Profizdat,
1961. 78 p. (Bibliotekha profsoiuznogo aktivista, no.15)
(MIRA 16:3)

(Trade unions—Finance)

BORISOV, V.P.; SYROVAREV, A.I.; KHANYKOV, V.V.; BLOKHIN, N.N., red.; SHAD-
RINA, N.D., tekhn. red.

[Finances of trade unions of the U.S.S.R.; organization and plan-
ning] Finansy professional'nykh soiuzov SSSR; organizatsiia-i pla-
nirovaniie. Izd.2., perer. i dop. Moskva, Izd-vo VTsSPS Profizdat,
1961. 199 p. (MIRA 14:8)

1. Moscow. Vysshaya zaochnaya shkola profdvizheniya.
(Trade unions—Finance)

YURCHENKO, F.A.; BORISOV, V.P.; GORBASH, A.A.

Effect of iron on the biosynthesis of chlortetracycline.

Ferm. i spirt.prom. 30 no.4:32-34 '64.

(MIRA 18:12)

1. Kiyevskiy spirtovoy trest (for Yurchenko). 2. Nemeshayevskiy zavod kormovykh antibiotikov (for Borisov, Gorbash).

BORISOV, V.P.; GORBASH, A.A.

Use of vegetable oils in the production of biomyoin. Spirt.prom. 29
no.1:22-23 '63. (MIRA 16:2)

1. Nemeshayevskiy zavod kormovykh antibiotikov.
(Chlortetracycline) (Oils and fats)

BORISOV, V.P.; GORBASH, A.F.

Utilization of waste filtrate in the production of antibiotic feeds.
Spart.prom. 29 no.2:41 '63. . (MIRA 16:3)

1. Nemeshayevskiy zavod kormovykh antibiotikov.
(Feeds) (Waste products)

YURCHENKO, F.A.; BORISOV, V.P.

Substituting ammonium chloride for ammonium nitrate in the
production media of antibiotics for feeds. Spirt.prom. 29 no.4:
28 '63. (MIRA 16:5)

1. Kiyevskiy spirtotrest.
(Ammonium chloride) (Feeds) (Antibiotics)

BORISOV, V.P.

Effect of rigidity requirements on the value of the minimum volume of
systems with given stresses. Trudy KAI no.77:61-70 '63.
(MIRA 17:10)

BORISOV, V.P.; GARYUGA, T.N.; GORBASH, A.A.

Biosynthesis of vitamin B₁₂ and its losses in the various stages
of the production of vitaminized biomycin feeds. Ferm. i spirt.
prom. 30 no.1:24-27 '64. (MIRA 17:11)

1. Nemeshayevskiy zavod kormovykh antibiotikov.

BORISOV, V.P.

OSHEROV, S.Ya., kandidat tekhnicheskikh nauk; BORISOV, V.P.; KAPLUN, A.V.,
inzhener.

Superiority of turbine drives for feed pumps of electric power
stations. Energomashinoostroenie 3 no.9:14-18 S '57. (MIRA 10:10)
(Turbines)

BORISOV, V.P., inzh.; TYRYSHKIN, V.G., kand. tekhn. nauk

Gas turbine manufacture in Italy. Energomashinostroenie 7
no.2:44-48 F '61. (MIRA 16:7)

(Italy--Gas turbines--Design and construction)

OSHEROV, S.Ya., kand.tekhn.nauk; BORISOV, V.P., inzh.; DERGACH, V.F., inzh.

GTU-15 gas turbine system manufactured by the "Ekonomaizer" factory.
Energomashinostroenie 9 no.8:8-11 Ag '63. (MIRA 16:8)
(Gas turbines)

BORISOV, V.P.

Using the method of given stresses in case of a hindered torsion of a caisson. Trudy KAI no.62:19-29 '61.

Using the focus method in designing thin-walled structures. Trudy KAI no.62:81-89 '61. (MIRA 17:2)

L 28720-65 EWT(d)/EWT(l)/EWT(m)/EWP(w)/EWA(d)/EWP(v)/T/EWP(t)/EWP(k)/EWP(b)/
EWA(h) Pf-l/Peb EM/JD

ACCESSION NR: AT5003075

S/2529/63/000/077/0061/0070

AUTHOR: Borisov, V. P.

TITLE: Effect of the stiffness requirements on the minimum volume of a system with prescribed stresses

SOURCE: Kazan. Aviatzionnyy institut. Trudy, no. 77, 1963. Stroitel'naya mekhanika, 61-70

TOPIC TAGS: shell stability, cylindrical shell, metal deformation, metal hardness, metal toughness, torsional vibration, shell rigidity

ABSTRACT: This article analyzes a method of calculating static indeterminable systems of minimum weight with respect to a prescribed stiffness. It is shown that this method can be used not only when calculating the lateral bending of beams and frames, but also for buckling, torsional buckling, etc. The requirements of stiffness as applied to structures increase their minimum weight. To solve the question of the rationality of one or another structure, it is always necessary to conduct a comparative analysis of the weight, strength and stiffness of a system of minimum volume with a system of constant cross section, other parameters

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The Effect of a Separation Boundary ... S/126/61/011/005/008/015
E073/E535

the self-diffusion of iron in the Fe-Ni (28% Ni) and Fe-Ni-C (29% Ni, 0.5% C) alloys. The coefficients of self-diffusion were determined in specimens subjected to martensitic transformation (series M) and also in specimens which remained austenitic (series A). The measurements were by the kinetic-absorption method and by the layer analysis method, separating volume diffusion from boundary diffusion. The isotope Fe-59 was employed. The temperature dependence of the volume diffusion determined by the kinetic-absorption method is plotted in Fig.1 (a - Fe-Ni alloy; b - Fe-Ni-C alloy). In the temperature range 800 to 1100°C, the diffusion coefficients of series M specimens, containing division boundaries additional to those of the series A specimens, were lower, which indicates that the intragranular boundaries have a braking effect. The general pattern of the results are in agreement with those obtained by the authors in earlier work using the layer analysis method (Ref.5: Zavodskaya laboratoriya, 1959, No.9) but the values obtained by the kinetic-absorption method are somewhat higher. In earlier work (Ref.6: DAN SSSR, 1959, 125, No.4), the present authors discussed some of the possible causes of the braking

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of the diffusion and it was suggested that the most probable reason for this decrease in D was the presence of separation boundaries oriented perpendicularly to the direction of diffusion. The present paper gives a theoretical analysis of this problem in the case of diffusion of atoms through vacancies. Consider a set of planes X_1, X_2 in a cubic lattice which are parallel to each other and lie at the distance of Δx (Fig.2). Each atom lying on one of the planes has K nearest lattice sites of which $K-2k$ lie in the same plane and k on each of the neighbouring planes. If Δt is the time during which an atom experiences a displacement to one of the two neighbouring planes with a probability $1/2$, then it can be shown (Ref.7: S. Chandrasekar "Stochastic problems in physics and astronomy", Russian translation, 1947) that the diffusion coefficient is given by $D = (\Delta x)^2 / 2\Delta t$. In the case of diffusion through vacancies, the diffusion coefficient can be defined as follows. It is assumed that the probability of displacement to a neighbouring plane is equal to $\beta \Delta t / \tau$, where $\beta = kb$ is the probability for the presence of a vacancy among the k nearest sites, b is the average concentration of vacancies

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within the lattice and $1/\tau$ is the average activation frequency. Next, using the condition $\beta \Delta t / \tau = 1/2$, it is found that $\Delta t = \tau / 2\beta$ and hence $D = \beta (\Delta x)^2 / \tau$. An atom A (Fig.2) which does not lie in the immediate neighbourhood of the separation boundary, undergoes during the time Δt one excursion to the left and one to the right with a probability of $1/2$. However, on the plane X_1 the excursion to the left during a small time interval Δt_1 occurs with the probability $\alpha = \beta \Delta t_1 / \tau$, while the excursion to the right occurs with the probability $\gamma = \beta_1 \Delta t_1 / \tau$, where $\beta_1 = kb_1$ and b_1 is the concentration of vacancies on the plane which is the separation boundary. For simplicity it is assumed that the boundary contains only a single atomic plane having the same coordination numbers K and k as the remainder of the lattice. An atom reaching the plane X_1 remains at rest during a time $\Delta t_1 = \tau / (\beta + \beta_1)$, which is determined by the condition $\alpha + \gamma = 1$. The time Δt_1 is N times smaller than Δt and $N = \Delta t / \Delta t_1 = (1 + \beta_1 / \beta) / 2$. The authors then determine the path of the particle which has undergone the transition $X_2 \rightarrow X_1$ towards

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E073/E555

the end of an interval Δt in order to determine its position at the end of the next interval Δt , bearing in mind the fact that the process occurs in N steps. If an atom reaches the boundary after a $X_1 \rightarrow X_0$ transition, then the lifetime of the vacancy left by it on the X_1 plane is $\tau/(K - k)$, while the time necessary for the atom to reach the energy sufficient for it to execute the next jump (activation time) is τ_1 , where $1/\tau_1$ is the activation frequency on the separation boundary. Since usually $\tau_1 \ll \tau$, i.e. the vacancy does not succeed in disappearing during τ_1 , it follows that the probability that the atom will be reflected from the separation boundary will be $\alpha_1 = \Delta t_0/\tau_1 = 1/(1 + \beta)$, while the probability that the atom will pass through the boundary is $\gamma_1 = \beta \Delta t_0/\tau_1 = \beta/(1 + \beta)$, where Δt_0 is the lifetime of the atom on the boundary and is much less than Δt_1 . The authors then determine the probabilities p and q that the particle reaching X_1 from X_2 will return to X_2 and that it will reach X_{-2} during the time interval Δt . It is shown that these two probabilities are given by:

$$p = \frac{a}{2} \sum_{m=0}^{N-1} \left[\gamma^m + \left(\gamma \frac{1-\beta}{1+\beta} \right)^m \right], \quad (1)$$

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E073/E535

$$q = \frac{a}{2} \sum_{m=0}^{N-1} \left[\gamma^m - \left(\gamma \frac{1-\beta}{1+\beta} \right)^m \right]. \quad (2)$$

The first expression holds when $\tau_1 \ll \tau$. Using the method described by Chandrasekar, it is then shown that the concentration of the diffusing atoms at a point on the separation boundary is given by

$$C(x, t) = (1-z)C_0(x, t) + \int_0^t C_0(x, \tau) g(t-\tau) d\tau, \quad (5)$$

where $C_0(x, t)$ is the concentration at this point in the absence of the separation boundary and $g(t)$ is a function whose Laplace-Carson representation is

$$g(p) = p \left\{ \left[1 + \frac{z}{1-z} \left(1 - \exp(-2p\Delta t) \right)^{1/2} \right]^{-1} - (1-z) \right\}. \quad (6)$$

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As can be seen from Eq.(5), the presence of the boundary leads to a reduction in the diffusion and the appearance of additional sources whose density is $g(t)$. Thus, the effect of the separation boundary as determined by this simplified analysis is in qualitative agreement with experimental data. For a quantitative description it is necessary to take into consideration the effect of a large number of successively distributed boundaries of blocks and grains. It is likely that the larger the number of boundaries intersected by the diffusing atom, the larger will be their total braking effect. Therefore, during a decrease in temperature when the depth of the diffusion penetration decreases, the braking on transverse boundaries weakens and becomes suppressed as a result of acceleration of the diffusion on account of longitudinally distributed boundaries. In the described experiments this occurred at about 700°C. A cessation of the braking effect in the range of high temperatures is attributed to a development of processes of relaxation in the structure, which led to a cessation of additional division boundaries in the specimens of the M-series. In the work of some authors an increase of the average diffusion

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coefficient was observed with decreasing grain size. Apparently in such a case the depth of the diffusion zone is commensurate with the grain size and the accelerating effect of the longitudinal boundaries prevails over the decelerating effect of the transverse boundaries. There are 3 figures, 1 table and 9 references: all Soviet. ✓

ASSOCIATION: Institut metallovedeniya i fiziki metallov
TsNIChM (Institute of Metal Science and Physics
of Metals TsNIChM)

SUBMITTED: June 23, 1960 (initially)
October 6, 1960 (after revision)

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BORISOV, V.T.; DUKHIN, A.I.

Tempera'ture measurement during the growth of metal crystals
from melts. Fiz. met.i metalloved. 11 no.6:893-898 Je '61.
(MIRA 14:6)

1. Institut metallovedeniya i fiziki metallov Tsentral'nogo
nauchno-issledovatel'skogo instituta chernoy metallurgii.
(Metal crystals—Growth)
(Thermocouples)

89730

18.9200

1145, 1418, 1454, 1045

S/020/61/136/003/013/027
B019/B056

AUTHOR: Borisov, V. T.

TITLE: The Crystallization of a Binary Alloy With Stability
Conservation

PERIODICAL: Doklady Akademii nauk SSSR, 1961, Vol. 136, No. 3,
pp. 583-586

TEXT: In the theory suggested by G. P. Ivantsov (Ref. 1), the diffusion cooling of a crystal during its growth developing at a linear rate is equal to the temperature interval between the liquidus- and the solidus lines in the diagram of state. As this theory does not describe the solidification with sufficient exactitude, it is expedient to develop a theory based upon the essential demand that all points in the crystallization of an alloy conserve the equilibrium. This basic demand can be satisfied only by assuming a two-phase zone between liquid and solid phase. In the present paper, this concept is dealt with for steady conditions, if growth takes place with constant rate v . Under these

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The Crystallization of a Binary Alloy With
Stability Conservation

S/020/61/136/003/013/027
B019/B056

conditions the properties of the two-phase zone are investigated. The two-phase state of the medium is described by means of the function $S(x,t)$. It was found in the investigation that the lack of undercooling in the two-phase zone requires an interrelation between the concentration $(SC)'' + (SC)' - kS'C = 0$, where k is a distribution coefficient, and the temperature $T'' + \varepsilon T' + \varepsilon S' = 0$, where $\varepsilon = D/a$ and D is the diffusion coefficient. This interrelation is given by the equation for the liquidus line $T = T_A - \varepsilon C$. Outside the two-phase zone the state of the alloy is described by $C'' + C' = 0$ and $T'' + \varepsilon T' = 0$. By the demand of the continuity of temperature and concentration and their derivations with respect to time on the boundary between single-phase- and two-phase zone it follows that during crystallization the entire alloy remains in the stable state. The equations $p = S - \varepsilon C + A$ and $S + \sigma C + mA = BS - \gamma$ are developed, which describe the two-phase zone. They determine the crystallization plane $S(x)$ and the dependence of the concentration on the coordinates. The temperature in this range depends linearly on $C(x)$. Unfortunately, the above-mentioned equations have no practical value, as they are not integrable. In a discussion of these equations, the

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The Crystallization of a Binary Alloy With
Stability Conservation

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crystallization process and the ratios among the phase components are investigated, where also the impurity segregation is taken into account. Finally, the crystallization character depending upon the initial state of the liquid (temperature, concentration) is investigated. There are 2 figures and 2 Soviet references.

ASSOCIATION: Institut metallovedeniya i fiziki metallov Tsentral'nogo
instituta yadernoy metallurgii (Institute of Metal Science
and Metal Physics of the Central Institute of Nuclear
Metallurgy)

PRESENTED: August 4, 1960, by G. V. Kurdyumov, Academician

SUBMITTED: August 4, 1960

Card 3/3

MISTAKE → original checked by N.H.
Russian is Chernoy
for Ferron.

L 19591-63 EWP(q)/EWT(m)/EWP(B)/BDS --AFFTC/ASD JD
ACCESSION NR: AT3001925 S/2912/62/000/000/0279/0284

AUTHORS: Borisov, V. T.; Dukhin, A. I.; Matveyev, Yu. Ye. Y9 B

TITLE: On the mechanism of the growth of metallic crystals /6

SOURCE: Kristallizatsiya i fazovyye perekhody. / Minsk, Izd-vo AN BSSR,
1962, 279-284

TOPIC TAGS: crystal, crystallization, crystallography, single-component, binary,
phase, phase discontinuity, boundary, Hg, Cd, K, Sn, Zn, Pb, growth, phase diagram,
equilibrium, kinetic, solidus, liquidus.

ABSTRACT: The paper discusses an expression for the rate of the displacement
of a planar phase-discontinuity boundary during the crystallization (CR) of a single-
component substance generally adopted by a number of authors (for example, O. Z.
Jantsch, Kristallographie, v.108, 1956, 185), an expression which has an extremely
general character and may be employed in the description of CR from a vapor, a
solution, or a fusion, also in the theory of phase transformations in solids, and
even in the theory of spiral growth. I. It is noted that as yet there are no depend-
able experimental data on the measurement of the supercooling on the surface of
growing crystals. Among all the tests surveyed the author decries the absence of

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even a single identification of a specific degree of supercooling; however, some upper-bound estimates of its value for growing crystals of Hg, Cd, and K were obtained in referenced test reports. Literature on the calculation of the density of growth points, an essential parameter in the understanding of the growth of metallic crystals, both for spiral growth (for isolated spirals) and for growth on two-dimensional nuclei, is cited. II. Whereas the initial equation given determines the rate of growth of a single-component liquid substance for a given degree of supercooling, a separate discussion is made of the analogous problem on the magnitude of the rate of displacement of the phase-discontinuity boundary in a binary system under a specified deviation of the state of the system from an equilibrium state. The expressions obtained give rise to nonequilibrium phase diagrams in a temperature-vs.-composition coordinate system. A plurality of such diagrams determines the kinetics of the CR of the alloy under different conditions. It is shown that the system of equations obtained is in effect analogous to the first kinetic equation obtained for the single-component substance, except that in the binary system the rate of growth of a given phase is determined by two kinetic coefficients. In measurements made of the temperature (T) along the CR front in the systems Sn-Zn and Sn-Pb, the authors observed a displacement of the T at the beginning of the two-phase zone of the alloys (counted from the liquidus) that is proportional to the rate of growth and the concentration of the second component and which

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amounts to a few degrees C at growth rates of 3-5 mm/sec. In conclusion it is noted that in nondiffusional CR of alloys the CR of the liquid proceeds always with a change in composition, even when the state of the crystallizing alloy is determined by a representative point that lies below the solidus of the equilibrium phase diagram. Orig. art. has 1 figure and 6 equations.

ASSOCIATION: none

SUBMITTED: 00

DATE ACQ: 16Apr63

ENCL: 00

SUB CODE: CH, PH, MA, EL

NO REF SOV: 005

OTHER: 003

Card 3/3